

REMARKS

Claims 1-13 are of record. These claims have been amended to be in better form. Dependent claims 14 and 15 have been added.

The Office Action is responded to using the same paragraph numbers.

1. Referring to the objections to the IDS, reference BB, in German, was cited by the PCT Examiner in the PCT search report and was placed in the "A" category (document defining the general state of the art which is not considered to be of particular relevance) with respect to claims 1 and 10. A copy of the PCT search report is attached.

No English translation of the document was found. The document apparently contains no Abstract. A translation of the claims in English is attached. The document BB should now be considered as complying with the IDS requirements.

2. The technical papers cited in the Specification have been deleted. Applicant believes that these would be helpful to a reader of a patent that might issue in this application, but since these are illustrative, they are not needed. Therefore, they have been cancelled.

3.&4. The Examiner objects to the use of the expression "circuit breaker" and refers to a definition. In applicant's view, the Examiner's definition is not quite accurate as applying to the field of electrical networks.

In "The New IEEE Standard Dictionary of Electrical and Electronics Terms, IEEE Std. 100-1992, ISBN 1-55937-240-0", the definition of "circuit breaker" begins by:

A device designed to open or close a circuit by nonautomatic means, and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating. A mechanical switching device capable of making, carrying, and breaking currents under normal circuit conditions and also making, carrying for a specified time, and breaking currents under specified abnormal circuit conditions such as those of short-circuit. . . .

In the domain of electric networks (25 kV and more), it is widely recognized that the majority, if not all of the circuit breakers are mechanical apparatuses whose function is not limited to only overload protection. Circuit breakers are widely used for

management purposes. In this respect, they are especially used to switch transformers, lines and shunt capacitors in service or to withdraw them from the networks. At 120 kV and more, circuit breakers are the sole switching elements used to operate the apparatuses under load conditions and to configure the networks.

Thus, the use of the expression "circuit breaker" in the present application is fully consistent with the standards in the domain of electric networks. Furthermore, circuit breakers are especially contemplated by the applicant for implementing the preferred embodiment of the presently claimed invention. Indeed, it is advantageous that the switch be of closed type such as a circuit breaker, without contact with the open, to prevent ice from hindering its proper operation and to implement the claimed de-icing method.

Accordingly, the objection should be withdrawn.

If the Examiner maintains this objection, applicant would be agreeable to substituting the term "electric switch".

5.&6. Claims 1-4, 7-8 and 10 are rejected as being anticipated by Pelletier, U.S. 5,907,239. Claims 1 and 10 are independent claims. Claims 2-3 and 7-8 depend from claim 1.

Applicant respectfully submits that in applying the prior art the Examiner appears to equate the presently claimed de-icing method only with the equipment and circuits used to implement it. This is neither appropriate nor correct. The Examiner credits intentions regarding de-icing of electric power lines to Pelletier even though such intentions appear nowhere in the patent. While some of the circuit diagrams shown in Pelletier may resemble some of those of the application, it is the method that is set forth in the claims that must be considered. For an anticipation rejection to be proper, as noted in MPEP §2131, "The identical invention must be shown in as complete detail as is contained in the claim". *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Clearly, Pelletier has no teaching of how to carry out a method of de-icing power lines and does not teach or suggest the steps of the methods of the rejected claims.

Pelletier only proposes an apparatus and a method allowing control of the power flow in a transformer or a line. In addition to the apparatus shown in Pelletier, there are many other apparatuses that can achieve the same result. Pelletier appears to make no mention of de-icing which applicant accomplishes by changing an angular offset of the current flowing in segments in a loop so that the current in at least one segment increases (see independent claims 1 and 10).

One means used to accomplish this (claim 2) is a "Phase-shifting transformer" (PST). This is a well known old technology (see *Current ctivity in Flexible AC Transmissions Systems*, IEEE, No. 92 The 0465-5 PWRD, p. 66, reporting the installation of a PST in 1938 by the company Boston Edison). In the present application, PSTs are only preferred types of apparatuses used for implementing the method, as shown in many of the Figures.

Pelletier mainly relates to the addition of reactive elements to PSTs in order to increase their range of use. Other apparatuses also allow controlling power flow in electric networks, for example the Thyristor Controlled Series Capacitor (TCSC) and "Unified Power Flow Controller" (UPFC). Both these apparatuses use electronic power converters.

Again, the field of application of Pelletier is strictly limited to power flow control in transformers or lines. In the case of transformers, the apparatus of Pelletier allows forming special transformers that act as constant current sources. For this reason, they poorly contribute to the possible fault currents, which allow adding supplementary transformers (classical or not) in the station without exceeding the breaking capacity of the existing circuit breakers. In the case of a power transmission line, the apparatus of Pelletier provides assistance to a classical PST regarding its line power flow control function by addition of a reactive element in parallel, which allows increasing the power flow of the line beyond what could be done with the PST alone. Pelletier discloses no other functions than those aforesaid. He does not teach or suggest a de-icing. Moreover, the implementation of the functions of Pelletier is achieved by acting over equipment circumscribed in a single station. Applicant's invention deals with segments of transmission lines.

Pelletier does not teach or even allude to implementing the claimed novel and advantageous method for de-icing transmission lines (claims 1 and 10) involving operation of circuit breakers in a preferred embodiment (claim 2), using capacitors (claim 3) and power regulators (claim 4). This method has considerable advantages in energy transport lines (claim 7) and energy distribution lines (claim 8) that may involve stations located more than a 100 kilometers away from one another.. Therefore, claims 1-4, 7-8 and 10 are not anticipated by Pelletier, are patentable and should be allowed.

7.&8. Claims 5-6 and 9 are rejected over Pelletier in view of Schauder, U.S. 6,433,520. These claims also depend directly or ultimately from claim 1, whose novelty over Pelletier is discussed above. The claims recite further steps in the method of the invention.

Schauder is relied upon to supply a teaching of the use of a switch to connect the line to be de-iced to the de-icer.

Schauder proposes a thyristor-based converter to induce a direct current in a line to heat its conductors by Joule effect. This line must be isolated from the network (column 1, lines 34-37). The direct voltage source cannot be connected to the lines of an active network because it is not alternating current. It is thus essential in Schauder that the line to be de-iced be isolated from the network prior to connecting the direct voltage source to this line. The line isolation is the reason that Schauder uses switches.

As discussed above, Pelletier does not teach or suggest the novel and advantageous de-icing method of claim 1. While Schauder may use switches in a de-icing apparatus, these are used to isolate the network during de-icing so that direct current can be applied. Therefore, the combination of Schauder with Pelletier would appear to be illogical. Even if the combination is improperly made, it still does not cure the basic deficiency of the principal reference to Pelletier as applied against claim 1. Accordingly, claims 5-6 and 9 are patentable and should be allowed.

Claims 11-13 are rejected over Pelletier in view of Stifter, U.S. 4,368,499, which is cited for its teaching of an interrupting network. Claims 11-13 depend from claim 10 whose novelty over Pelletier is discussed above.

Applicant submits that Stifter is not at all related to the subject matter of either Pelletier or the present application. Stifter proposes a device intended to isolate an electrical apparatus from voltage perturbations in the network (column 1, lines 31-54). In normal operation, the device connects the apparatus that it protects to the network. When an overload due to an unacceptable voltage drop condition occurs, the device disconnects the apparatus that it protects from the network. Following a disconnection, the device reconnects the apparatus to the network only after a sufficient delay has elapsed to give time for the voltage of the network to get back within normal limits.

It is submitted that the combination of Stifter with Pelletier makes no logical sense and even if made, does not cure the basic defect of Pelletier relative to claim 10, from which claims 11-13 depend. Therefore, these claims also are patentable and should be allowed.

Claims 14 and 15 have been added and respectively depend from claims 1 and 10. These claims recite that the current is alternating current.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Prompt and favorable action is requested.

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Respectfully submitted,

By 

S. Peter Ludwig

Registration No.: 25,351

DARBY & DARBY P.C.

P.O. Box 5257

New York, New York 10150-5257

(212) 527-7700

(212) 527-7701 (Fax)

Attorneys/Agents For Applicant

1. Procedure for the electrical heating of overhead lines and their auxiliary facilities for removal of snow, frost or ice formation, characterized by the fact that the phase of the line current is adjusted in such a manner that the geometrical sums of the full load current and line current are the same or close to each other in the parallel switched lines.

2. A. Procedure according to claim 1 wherein transformers are used as power source of the line current.

3. A Procedure according to claim 1, wherein fixed transformers are used as a source of the line current, whose induced current has a phase position against the middle phase position of the full load currents such that the geometrical current sums are equivalent or close to each other in the parallel switched lines.

4. A procedure according to claim 3, characterized in that the transformers between the lines increase the phase at one or at both ends of the line in the bus bar of the station.